

## Project #2 Description

In this project, you will design and implement a database for keeping track of Covid-19 vaccination program that is currently undergoing at federal, state and local level in USA. The database should be designed to show number of shots procured by federal government and distributed to all states. States, in turn distribute the same to various local bodies such as

- health care centers such as hospitals or long-term care facilities,
- city run covid vaccination camps
- private labs and pharmacy outlets such as Walgreens, CVS, Walmart etc.

The system also should be capable of showing what *types of vaccines* has been procured from which manufacturers and distributed to which unit (state/local etc.).

The system should be designed to keep track of following regarding progress -

- Manufacturers
- Number of doses procured by manufacturer, by types
- Number of doses distributed by unit (state/local/independent) by manufacturer, by types
- Date-wise doses administered by unit (state/local/independent)
- Doses administered should be identifiable if it is the first dose or second dose for the individual
- People who are getting administered, their name, address, contact, age, medical conditions, any kinds of allergy, *vaccination phase* they fall
- How many doses shipped by federal body (CDC)
- How many distributed

The system should be capable of generating reports about the vaccination progress -

- Daily progress per million population
- Cumulative progress

You can assume the following for -

*Vaccination phases for population groups/phases*

- 1A (Healthcare - Tier1)
- 1A - Healthcare (Tier2)
- 1A - long term care - assisted living residents
- 1A - long-term care - nursing home residents
- 1B - 16-64 any medical condition
- 1B - population over 65
- 1C - Education and child care personnel
- 2 - people 16 years and older

The *vaccine types* can be-

- Whole virus - Covaxin
- Protein subunit - Novavax
- Viral vector – Johnson and Johnson, CanSino, AstraZeneca
- Nucleic acid or mRNA based – Pfizer-BioNTech & Moderna

You will first design ER/EER schema diagram based upon the COVID-VACCINE database requirements specified above and create the schema diagram and documentation report describing your design choices. As part of this assignment, you should identify any missing or incomplete requirements, and explicitly state them in your documentation. You should also explicitly state any assumptions you made that were not part of the requirements listed above.

The second part of the assignment will be to map the ER/EER schema design to a relational database schema, and create the tables corresponding to the relational schema using the ORACLE DBMS (or MySQL). You will add to your report a listing of the CREATE TABLE statements. Specify as many constraints (key, referential integrity) as you can in the relational schema. You should state the choices you made during the EER-to-relational mapping, and the reasons for your choices.

The third part of the project is to load some data into the database and apply certain update transactions and retrieval queries. You will create your own data. Include at least 100 persons, couple of states, couple of vaccine types, 10 providers/local bodies (counties/hospitals/pharmacy outlets etc), a week of progress.

The following are the tasks for the third part of the project:

1. Load some initial data (as discussed above) into the database tables that you created in Part 2 of the assignment. You can either write a loading program, or use SQL/PLUS (insert command), or use SQL/FORMS. Your data should be kept in files so that it can easily be reloaded during debugging. The data format should be designed by you. (Note: You can also use the transactions created by you in item 3 below to load some of the data).
2. Write queries to retrieve and print all the data you entered. Try to print the data so that it is easy to understand (for example, print appropriate headings, such as: Date, Vaccine Manufacturer, doses administered etc.).
3. Write a query that will prepare a report for daily progress by state, county etc.
4. Write the following database update transactions using JAVA/JDBC or PHP or some other programming/scripting language.
  - 4.1 The 1st transaction is to procure x number of doses of one type of vaccine
  - 4.2 The 2nd transaction is to distribute certain amount to a state.
  - 4.3 The 3rd transaction is to distribute certain amount to to a local body

4.4 The 4th transaction is to add information about a new dose administered, patient details, 1<sup>st</sup> or 2<sup>nd</sup> dose etc.

4.5 The 5th transaction is to report an adverse reaction for a patient after administration

5. Write a trigger –

5.1 To notify the CDC if one individual is administered who should be in phase 2, assuming the current phase running is 1B.

6. Each transaction should have a user friendly interface to enter the information needed by the transaction. This can either be a Web-based interface, a command line interface, or a forms interface.

Due Dates:

1. Parts 1 and 2 Due Date: **Sunday Apr 18**. This should include for Part 1 the EER diagrams for your designs as well as documentation describing any assumptions you made, and the reasons for your design choices. Draw the EER diagrams using the notation in the textbook. You can also use UML class diagrams notation. You can use any drawing tool for drawing your diagrams. For part 2, what you turn in should include your relational schema diagram design and your CREATE table statements, and documentation describing your EER-to-relational mapping choices.
2. Part 3 Due Date: **Sunday Apr 25**. This will include an online demo demonstrating that your implementation works, as well as demonstrating your transactions to the grader. Source code of all your transactions should be submitted, as well as the data files. A demo schedule will be determined before the due date.

The files that you turn in should be submitted via Canvas to the GTA by midnight of each due date.

Files to be submitted –

1. Soft/scanned copies
  - a. of your EER diagrams and documentation (Part 1)
  - b. relational schema diagram with EER-to-relational mapping documentation (Part 2)
2. data files as loaded in the database as discussed in item 2 of Part 3 of the assignment.

Late penalty: -5% per day late.

Project teams: Each project can be done in a team of 2 persons, or individually.